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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,019	12/20/2001	Ralph H. Johnson	15436.436.3	6105

22913 7590 09/09/2005

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EXAMINER	
NGUYEN, DUNG T	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/026,019	JOHNSON, RALPH H.	
	Examiner	Art Unit	
	Dung (Michael) T. Nguyen	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7,9,14-16,18,21-30 and 32-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *30,33 and 34* is/are allowed.

6)☒ Claim(s) *1-3,5-7,9,14-16,18,21-29 and 32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *06/03/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5-7, 9, 14-16, 18, 21-29, and 32 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2 and 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Jiang et al. (6642070).

With respect to claim 1, Jiang show in Fig.1 a vertical cavity surface emitting laser (VCSEL), comprising: an active region 108 further comprising at least one quantum well 107 comprising InGaAsN and including barrier layers 109 sandwiching said at least one quantum well, the barrier layers including nitrogen (col.3, l.57); and confinement layers 106 and 110 sandwiching said active region, wherein the barrier layers are comprised of material that reduces a level of non-confining valence band discontinuity in the quantum well due to the presence of nitrogen in the quantum well (it is inherent that nitrogen existed in the barrier layers could perform the function as recited in the claim).

With respect to claims 2 and 15, col.3, l.57 discloses the GaAsN barrier layers.

With respect to claim 14, col.3, l.53 discloses the quantum well further comprising Sb.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 9, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (6642070) in view of Sun et al. (6567448). Jiang disclose all limitations of the claims except for the AlGaAs confinement layers.

Sun teach the AlGaAs confinement layers sandwiching the quantum well (col.3, l.51-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Jiang what is taught by Sun to provide carrier confinement and to produce photon emission and optical amplification within the VCSEL (col.5, l.9-15).

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (6642070) in view of Ouchi (6046096).

With respect to claim 5, Jiang disclose all limitations of the claim except for > 1% N.

Ouchi teaches approximately 1% N (col.2, l.40-41).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Jiang what is taught by Ouchi in order to have a VCSEL to be used in a long wavelength (col.2, l.39-40).

With respect to claims 6-7, Ouchi teaches the thickness of the InGaAsN quantum well (col.7, l.38).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Jiang what is taught by Ouchi to employ the peak wavelength of the InGaAsN quantum well to shift to a longer wavelength (col.7, l.40-48).

Claims 21-25 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi (6046096) in view of Sun et al. (6567448).

With respect to claims 21-22, 24-25, and 28, Ouchi discloses an active region further comprising at least one quantum well comprised of InGaAsN and including AlGaAs barrier layers sandwiching said at least one quantum well (col.1, l.34-36).

Ouchi lacks AlGaAs confinement layers sandwiching said active region.

Sun teach AlGaAs confinement layers sandwiching said active region (col.3, l.50-54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Ouchi what is taught by Sun to provide carrier confinement and to produce photon emission and optical amplification within the VCSEL (col.5, l.9-15).

With respect to claims 23 and 27, Ouchi discloses the thickness of the InGaAsN quantum well (col.7, l.38).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ouchi (6046096) in view of Sun et al. (6567448) and further in view of Riechert et al. (2003/0179792). Ouchi and Sun disclose all limitations of the claim except for the InGaAsN barrier layers.

Riechert teach the InGaAsN barrier layers (para.0004, last two lines).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Ouchi and Sun what is taught by Riechert to employ an alternative semiconductor material for the barrier layers.

Claims 29 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Riechert et al. (2003/0179792) in view of Sun et al. (6567448). Riechert a vertical cavity surface emitting laser (VCSEL), comprising: an active region further comprising at least one quantum well comprised of InGaAsN and including InGaAs (para.0002) or GaAsN (para.0010) barrier layers sandwiching said at least one quantum well.

Riechert lack AlGaAs confinement layers sandwiching said active region.

Sun teach AlGaAs confinement layers sandwiching said active region (col.3, l.50-54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Riechert what is taught by Sun to provide carrier confinement and to produce photon emission and optical amplification within the VCSEL (col.5, l.9-15).

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims 30 and 33 are allowed over Ouchi, Jiang, Riechert, and Sun prior art because they fail to teach the limitation of GaAsN confinement layers sandwiching said active region.

Claim 34 is allowed over Ouchi, Jiang, Riechert, and Sun prior art because they fail to teach the limitation of a flattening layer interposed between the lower confinement layer and the at least one quantum well.

Communication Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung (Michael) T Nguyen whose telephone number is (571) 272-1949. The examiner can normally be reached on 8:30 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3329.

JAMES MENEFEE

Michael Dung Nguyen